Monitoring in the Instrument Operations Center

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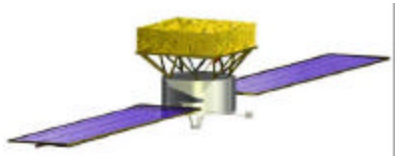
- The Instrument Operations Center (IOC) is tasked with monitoring the status and health of the GLAST LAT.
  - Maintain complete knowledge and history of instrument state.
  - Manage instrument health and respond to contingencies.
- Note significant overlap between this task and Command State verification.

Monitoring in the IOC

- **Concept:**
  - Automated monitoring of instrument state, health, and environment is performed on Realtime/Quicklook and Production data.
    - Realtime/Quicklook:
      - Frequent during Instrument Checkout Phase?
      - How often during standard operations?
        - » 1 - 2 contacts per day, ~10 minutes each, devoted to Production Data.
        - » Risky. Need autonomous, on-board contingency operations.
    - Production Data Deliveries: Once per day, covering full 24 hours.
  - Automated trend analysis.
  - Automated limit checking.
  - Automated paging of cognizant Instrument Team member on **Red** limit violations.

- ***Infrequent ground contacts Þ on-board monitoring essential.***
- ***Ground monitoring advantages: more detailed, trend analysis.***



Housekeeping Data

- Analog variables
  - Voltages and currents
    - bus, instrument subsystems
  - Temperatures
    - instrument subsystems, heat pipes
    - active and makeup heaters
      - currents, voltages
- Discrete variables
  - Trigger masks
    - ACD, TKR, and CAL
    - Table dumps or Table ID
  - Control/Status registers
    - LLD settings
    - Gain settings
    - Trigger logic, blocking times
  - DAQ status
    - Error log
    - Trigger and Data modes
    - Load monitor
    - DAQ mode: Science, warm start, cold start, code load.
    - Telemetry format
- Instrument diagnostics
  - Instrument mode
    - scanning Sci, pointed Sci, GRB, SAA
  - Command counters
    - authorized, rejected
  - Primary or redundant system
  - Rates
    - Triggers, L1T, L2T
    - LLDs, noise occupancy
    - ACD rates and spectra
- S/C status and environment
  - S/C mode:
    - scanning, pointed, safehold
  - S/C ephemeris and attitude
  - Day/night flag?
  - Charged-particle monitor rates?
    - CPM configuration

How are Data Displayed?

- Color-coded text displays
- Graphical displays
  - Fiducials
    - Environmental
      - UT, day/night, SAA, MacIlwain L, GOES flares, etc.
      - Context instrument GRB triggers
    - Instrumental
      - Mode (pointed, scanning, GRB)
  - L1T, L2T rate histories
    - Summed and by tower
  - Tracker strip rate histories
  - Calorimeter bar LLD rate histories
  - ACD
    - LLD rate histories
    - Tile spectra